

REMARKS

Claims 1, 2, 4, 5, 7, and 8 are in this application and are presented for consideration. By this Amendment, Applicant has canceled claims 3, 6 and 9. Claims 1, 4 and 7 are presented for reconsideration. Claim 2 has been revised and is presented along with dependent claims 5 and 8 for reconsideration based on the new claim language. The new claim language is believed to be clear with regard to defining over the prior art of record.

The drawings have been objected to based on the position that Figs. 7, 9A, 9B and 9C should be designated "Prior Art". Applicant attaches hereto replacement sheets with the proper prior art legend. Approval of these replacement sheets is requested.

The abstract has been objected to. Applicant presents a new Abstract of the Disclosure attached hereto and forming a part of this response.

The specification has been objected to for including a reference to the claims. Applicant has now amended this text.

Claim 6 has been objected to. This claim has now been canceled.

Claim 1 has been rejected as being anticipated by Yamaji et al. (U.S. 4,583,861).

YAMAJI (USP4,583,861) relates to an apparatus for assessing the surface state of Al-deposited films, in which light receiving elements, such as photovoltaic cells, are disposed radially on a semi-spherical surface so as to measure the distribution of reflection angles of the reflected light incident upon the center of the semi-spherical surface via the light receiving elements. To examine the entire wafer surface, it is necessary to make measurements by moving the sensor part two-dimensionally, or rotating the stage in two-dimensions on which

the wafer is placed. Thus the process requires a huge amount of time to measure the entire wafer surface.

From the discussion in YAMAJI, particularly the objective, one cannot consider that YAMAJI is supposed to use linear image sensors as light receiving elements. It appears not to be the case that YAMAJI can have a construction in which a plurality of linear image sensors are disposed in such a manner that the normal lines of their light receiving surfaces pass through the central axis of the virtual semi-cylindrical surface, and in parallel with the direction of the central axis, as claimed according to the present invention. The structures of YAMAJI do not provide this as disclosed and there is no suggestion of providing this.

The present invention as highlighted in claim 1 of the present application and YAMAJI both involve a sensor head for measuring the radial components of light on the surface of a flat member via light receiving elements. However, as claimed in claim 1, a plurality of linear image sensors are used as the light receiving elements. These image sensors are disposed in such a manner that the normal lines of their light receiving surfaces pass through the central axis of the virtual semi-cylindrical surface and in parallel with the direction of the central axis. YAMAJI on the other hand discloses the light receiving elements as discrete devices, such as photodiodes or photovoltaic cells, which are disposed radially on the semi-spherical surface. In this way, the subject matter of claim 1 and YAMAJI are essentially different from each other. These differences come from differences in measuring objects. Within the scope of the disclosure of YAMAJI, it is not the case that a plurality of the light receiving elements are disposed in such a manner that the normal line of the light receiving surface passes through the central axis of

the virtual semi-cylindrical surface and in parallel with the direction of the central axis, and it is also not the case in YAMAJI that the linear image sensors are used as light receiving elements. Although it is argued that YAMAJI clearly states that a plurality of linear image sensors are disposed in parallel with the central axis of the semi-cylindrical surface, specific support for this is not clear. Even if the technical idea described in YAMAJI can be easily applied to the measurement of brightness irregularities, YAMAJI is lacking the concept of a semi-cylindrical surface. YAMAJI is more along the concept of a configuration claimed in original claims 3,6 and 9, which we have now been canceled

Considering the teachings of YAMAJI there is no suggestion of the use of linear image sensors as light receiving elements and the arrangement of a plurality of linear image sensors in parallel with the central axis of the semi-cylindrical surface.

The invention as set forth in claim 1 of the present application makes it possible to acquire predetermined radial angular components in a column of pixels of a liquid crystal panel, etc. by adopting the configuration described in the application, and to obtain radial angular components on the entire surface of the liquid crystal panel in a short period of time by sequentially carrying out the above measurements in the direction of rows. All this leads to a distinguished benefit of the present application where an inspection equivalent to the conventional inspection of display irregularities that is conducted visually by inspection personnel can be achieved automatically, quickly and more accurately.

Even if the technical concept disclosed in YAMAJI is applied to the inspection of liquid crystal panels, etc., the abovementioned benefits cannot be accomplished unless the

configuration in which linear image sensors are used as light receiving elements and a plurality of linear image sensors are disposed in parallel with the central axis of the semi-cylindrical surface is employed.

Although it is not dispositive as to the issue of patentability, it is interesting to note in this connection the fact that the Japanese Patent Office granted a patent on the corresponding application on the present application, despite the existence of the attached Japanese Published Unexamined Patent Application No. Hei-07-333104 (Cited in the IDS portion below). This as discussed in the previous Information Disclosure Statement (IDS) discloses an arrangement that is more similar to the claimed features of claim 1 of the present application than YAMAJI. This lends support to applicant's position that the use of linear image sensors as light receiving elements and the arrangement of a plurality of linear image sensors in parallel with the central axis of the semi-cylindrical surface are not obvious or cannot be readily conceived from or suggested by the technical concepts disclosed in YAMAJI.

It follows from this, therefore, that claim 1, and claims 4 and 7 (both of which depend from claim 1), are fully patentable. As such, Applicant requests that the Examiner favorably reconsider claim 1 and claims dependent thereon.

Claims 2 - 3 have been rejected as anticipated by Lebling et al. (U.S. 5,483,858).

LEBLING (USP4,583,858) relates to a chromatometry inspection apparatus for colored surfaces, in which rays of light from a light source is irradiated upon a point (i.e., the center of a semi-sphere) of the colored surface via a plurality of optical fiber bundles 10, 11 and 12 radially fitted to a semispherical surface, and the reflected or diffused light is detected by a light

receiving part via an optical fiber bundle 24 provided on the vertex of the semi-sphere. According to the stated anticipation rejection, the optical fiber bundle 24 provided on the vertex of the semi-sphere, is considered to correspond to the optical system according to the present invention. The relationship between the emission system and receiving system of light, however, is diametrically opposed as to concept and features to that of the present invention. In this case, too, moreover, it is necessary to move the sensor two-dimensionally or move the colored surface itself two-dimensionally to inspect the entire colored surface, thus involving a huge amount of time to complete the inspection.

The invention as claimed in claim 2 of the present application and LEBLING both involve a sensor head that leads light from the surface of a flat member via an optical system. However, LEBLING is quite different from what is claimed in claim 2 since the invention claimed in claim 2 of the present application comprises an optical system whose light receiving means receive rays of light incident vertically upon predetermined positions of a virtual cylindrical surface, and requires linear image sensors disposed extending in parallel with the central axis of the virtual cylindrical surface for receiving the rays of light received by the optical system. LEBLING comprises an optical system that is a single optical fiber bundle disposed on the vertex of a semi-sphere. There is no suggestion of providing linear image sensors as light receiving elements.

These differences come from differences in measuring objects. Within the teachings disclosed by LEBLING there is no hint of a light receiving means comprising an optical system for receiving rays of light incident vertically upon predetermined positions on a virtual

semi-cylindrical surface, and linear image sensors disposed in parallel with the central axis of the virtual semicylindrical surface for receiving the light received by the optical system. Although it is argued that LEBLING clearly suggests that light receiving means 10, 11 and 12 receive light in the radial direction from a linear light source, specific grounds for the argument are not made clear.

Even if the technical idea described in LEBLING can be easily applied to the measurement of brightness irregularities (this is not established from the teachings of LEBLING), LEBLING is lacking the teaching or suggestion of a semi-cylindrical surface and can only yield the configuration described at best in canceled claims 3,6 and 9. With LEBLING, moreover, there is no suggestion that would motivate one of ordinary skill in the art to conceive the configuration comprising an optical system for receiving rays of light incident vertically upon predetermined positions of the virtual semi-cylindrical surface, and linear image sensors disposed in parallel with the central axis of the semi-cylindrical surface for receiving the light received by the optical system.

The invention as set forth in claim 2 of the present application, as in the case of the invention as set forth in claim 1 of the present invention, makes it possible to acquire predetermined radial angular components in a column of pixels of a liquid crystal panel, etc. by adopting the configuration described therein, and to obtain radial angular components on the entire surface of the liquid crystal panel in a short period of time by sequentially carrying out the above measurements in the direction of rows. All this leads to a distinguished benefit of the present application where an inspection equivalent to the conventional inspection of

display irregularities that is conducted visually by inspection personnel can be achieved automatically, quickly and more accurately.

Even if the technical concept disclosed in LEBLING is applied to the inspection of liquid crystal panel, etc., the abovementioned benefit cannot be accomplished unless the configuration in which linear image sensors are used as light receiving elements and a plurality of linear image sensors are disposed in parallel with the central axis of the semi-cylindrical surface is employed. As with claim 1 it is significant that the Japanese Patent Office granted a patent on the present application, despite the existence of the aforementioned Japanese Published Unexamined Patent Application No. Hei-07-333104 (see IDS discussion below) that is closer in structure to the subject matter of claim 2 of the present application than LEBLING. This does suggest that the use of linear image sensors as light receiving elements and the arrangement of a plurality of linear image sensors in parallel with the central axis of the semi-cylindrical surface are not obvious or cannot be readily conceived and not suggested from the technical concept disclosed in LEBLING.

Accordingly, Applicant requests that the Examiner reconsider the rejection of claims 2 and claims 5 and 8 (which depend on claim 2). The claims define subject matter which is neither taught nor suggested by the prior art as a whole.

PATENT ABSTRACTS OF JAPAN and publication of Japanese Published Unexamined Application No. Hei-07-333104 was cited in the Information Disclosure Statement of June 18, 2001.

Applicant is also now attaching what is believed to be a full translation provided by the

Japanese Patent Office of Japanese Published Unexamined Application No. HEI-07-33104.

Applicant requests that the Examiner consider references which have come to Applicant's attention from Office Actions of the corresponding Japanese Patent Office Examination Procedure. The above mentioned HEI 07-333104 which is attached hereto is already cited in a previous Information Disclosure Statement and was acknowledged by the Examiner in the first Office Action. However, other references were cited with the Information Disclosure Statement of March 19, 2002 and Applicant does not see any reference to these in the official record. These and some additional references (which are considered to be less important) are referenced herein.

PATENT ABSTRACTS OF JAPAN and publication of Japanese Published Unexamined Application No. Hei-07-294328 has already been cited in the Information Disclosure Statement of March 19, 2002. The reference discloses a photometry device wherein luminance meters 31 are provided in an optical box 8 and multiples of these were assigned in radial positions such that the optical axis of the meters cross each other at a light detecting aperture. Applicant attaches the Patent Abstracts of Japan document with the further submission of this reference.

PATENT ABSTRACTS OF JAPAN and publication of Japanese Published Unexamined Application No. Hei-04-288638 was already cited with the Information Disclosure Statement of March 19, 2002. This reference discloses a computer system for storing large size files and forecasting such. Applicant attaches the Patent Abstracts of Japan document for further consideration.

PATENT ABSTRACTS OF JAPAN and publication of Japanese Published Unexamined

Application No. Hei-07-035645 discloses an apparatus for inspecting liquid crystal panels. As can be appreciated from the English language abstract the structure can rotate so that the liquid crystal panel can be photographed in the same state as when actually used and such that it is possible to detect angle characteristics of the various luminous elements.

PATENT ABSTRACTS OF JAPAN of Japanese Published Unexamined Application No. Sho-62-242833 was cited in the Information Disclosure Statement of March 19, 2002. The reference discloses a measuring instrument for far field patterns with a photo detector 5 fitted to a rail 4 so that its surface 5a is in the center direction of the rail. The rail has been rotated.

Utility Model Publication of Japanese Published Unexamined Application No. Hei-01-148834 discloses a sensing arrangement.


PATENT ABSTRACTS OF JAPAN of Japanese Published Unexamined Application No. Hei06-094515 discloses a light divergent measuring apparatus with a lens 12 and a line sensor 14. The lens is placed so that its focus coincides with a measuring point.

Consideration of the references is requested.

Favorable action on the merits is requested.

Respectfully submitted
for Applicant,

By:


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Enclosed: Abstract of the Disclosure
(3) Replacement Sheets of Drawings
PTO-1449 Form
copies of (7) References
Credit Card Payment Form


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IN THE DRAWINGS:

The drawings have been objected to based on the position that Figs. 7, 9A, 9B and 9C should be designated "Prior Art". Applicant attaches hereto replacement sheets with the proper prior art legend. Approval of these replacement sheets is requested.